

Kleinrock

Report: First Packet Radio Working Group Meeting

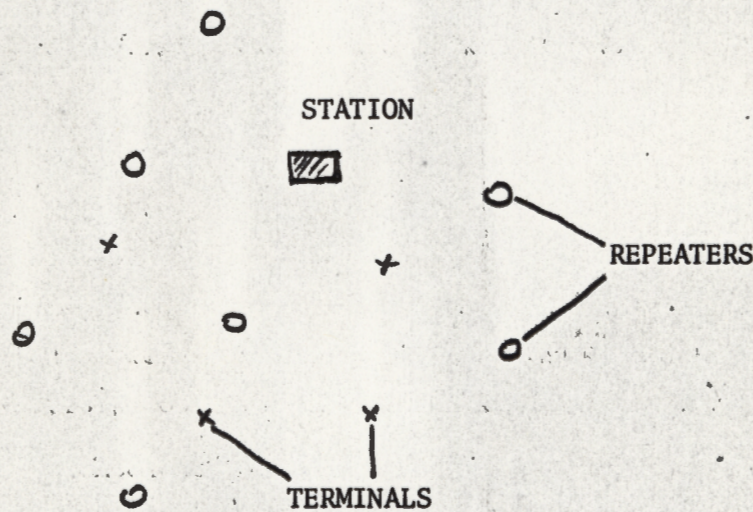
First description of the system.

The system consists of a number of fixed computing facilities and a large number of mobile users. Perhaps there will be a unique identification number for each user. A packet switching scheme will be used for communication between 2 users, or between users and the computing facilities. Multiple copies of the same packet are permitted..

Three major components will be considered:

1. Packet Radio Terminal (mobile users)
2. Packet Radio Repeater (relays or "transponders")
3. Packet Radio Station

Repeaters and stations are fixed in location



It is not clear at this point whether the system will use one frequency or different frequencies for transmission and reception. The concept of capture is important in case of interference. The failure of one component should not affect the entire system.

Dick Van Slyke (NAC) gave the example of broadcast extension of the ARPA net covering the U.S.

Some traffic Control Schemes.

1. Regionalization of repeaters to Station.
2. Handover number: limits the number of retransmissions.
3. Memory
4. Broadcasting path (adaptive procedures in case of failures).

Tasks (Bob Kahn)

1. User requirements: SRI
UCLA will provide input about necessary parameters.
2. Components (devices & properties): Collins
3. Queueing Analysis (delay, percolation, routing): UCLA, NAC, SRI
4. Component Organization & Reliability: NAC
5. System Design: postponed for the time being
6. Radio propagation (range, power): SRI, Hawaii, Collins
7. Cost Studies (e.g. cost vs. frequency): SRI, Hawaii, Collins, NAC
8. Documentation

Bob Metcalfe suggested:

1. Privacy
2. ARPA net interface
3. Human factors (terminals)
4. Accounting

Technical Problems. (Open to all, suggested by L. Roberts)

- . Comparison of different techniques
- . Line of Sight area vs. frequency
- . Modulation: what kind; sync speed
- . Capture ratio
- . Multiple station interference (dense areas)
- . Hand off techniques (for mobiles: updating the station number he is heading to)
- . Slot sync methods
- . Reservations? (may be two classes of users: big and small. The big users make reservations, the small ones interfere with the big ones.)
- . Repeaters: strategy, routing
- . Security, encryption

L. Roberts proposed the following set of values as an example:

	<u># of Terminals</u>	<u>On state</u>		Packet [*] Size $\bar{N} \bar{N}^2$ bits	Prob. of ON State
		<u>Rate</u> <u>in</u>	<u>packets/sec.</u> <u>out</u>		
Compressed voice	330	2.5	2.5	360	0.03
TTY like Terminals	100	1.0	0.1	100	0.10
Unattended Sensors	1600	0	0.01	50	1.0
Small Computers (Fine Control)	10	10	1	1000	0.05
Display Printers	16	10	1	1000	0.05
Position Location	500	0	0.01	0	1.0

^{*}Excluding header

95 packets/sec at 1000 bits = 100 KB

120 packets/sec. at 400 bits = 50 KB

chop up the 100-150
1000 bit packets KB Channel

SRI

David G. Falconer

David Brown
Project Supervisor
PSN Studies

Ward Hardman
(Military
Communication
Requirements)

Stan Fralich
(Communication
Technology)

Elmer Shapiro
(Packet
Switching
Techniques)

Arlin Torbett
(Network Synthesis
& Evaluation)

P. Wong
Network
Control

O. Yu
Network
Synthesis
(Queueing
Analysis)

C. Herald
Network
Evaluation

Study from
terminals
upwards

Study from
system
downwards